Effects of music therapy on prosocial behavior of students with autism and developmental disabilities

Catherine L de Mers

University of Nevada, Las Vegas

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EFFECTS OF MUSIC THERAPY ON PROSOCIAL BEHAVIOR OF STUDENTS WITH AUTISM AND DEVELOPMENTAL DISABILITIES

by

Catherine L. de Mers

Bachelor of Music Therapy
Loyola University New Orleans
2004

A thesis submitted in partial fulfillment of the requirements for the

Master of Science Degree in Special Education
Department of Special Education
College of Education

Graduate College
University of Nevada, Las Vegas
August 2007
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Examination Committee Chair

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Graduate College Faculty Representative
Effects of Music Therapy on Prosocial Behavior of Students with Autism and Developmental Disabilities

by

Catherine L. de Mers

Dr. Matt Tincani, Examination Committee Chair
Assistant Professor of Special Education
University of Nevada, Las Vegas

This research study employed a multiple baseline across participants design to investigate the effects of music therapy intervention on hitting, screaming, and asking of three children with autism and/or developmental disabilities. Behaviors were observed and recorded during 10-minute free-play sessions both during baseline and immediately after music therapy sessions during intervention. Interobserver agreement and procedural fidelity data were collected. Music therapy sessions were modeled on literature pertaining to music therapy with children with autism. In addition, social validity surveys were collected to answer research questions pertaining to the social validity of music therapy as an intervention.

Findings indicate that music therapy produced moderate and gradual effects on hitting, screaming, and asking. Hitting and screaming decreased following intervention, while asking increased. Intervention effects were maintained three weeks following
intervention. Implications of the study for music therapy practice and future research are discussed.
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CHAPTER 1

INTRODUCTION

It is currently estimated that Autism Spectrum Disorders (ASD) affect 1 in 150 individuals in the United States (CDC, 2007; Chakrabarti & Fombonne, 2005; Fombonne, 2003). Better diagnosis and a broader definition of ASD have likely caused the increased prevalence (Fombonne, 2005). However, public concern and parent distress at what appears to be an “autism epidemic” has led to the overabundance of treatments for autism in recent years. Some treatments are supported by rigorous research which has led to widespread use and increased funding for continued research and implementation (Simpson, 2005). However, the majority of treatments available fall into a gray area in terms of amount and validity of supporting evidence. This makes it difficult to objectively determine their effects on autism because the research results are inconsistent, based on poorly designed studies, or permeated with personal bias on the part of the researchers.

Music therapy is defined as “a systematic process of intervention wherein the therapist helps the client to promote health, using music experiences and the relationships that develop through them as dynamic forces of change” (Bruscia, 1998, 20). The logical basis for the use of music therapy in autism treatment is supported in the early writings of Kanner himself (Kanner, 1943a, 1943b). In his original writings identifying the first group of children labeled “autistic,” Kanner noted their musical ability to retain and sing
a variety of melodies. In addition, Rimland (1964) used musical ability to differentially diagnose children with ASD.

Music therapy today is a growing field of continually improving research and clinical practice. Three journals published in the United States, the *Journal of Music Therapy*, *Music Therapy: Journal of the American Music Therapy Association*, and *Music Therapy Perspectives* contain a plethora of quantitative and qualitative research studies in addition to meta-analyses and philosophical/theoretical articles. Additional journals published outside the United States include *The Australian Journal of Music Therapy*, *The Nordic Journal of Music Therapy*, *The British Journal of Music Therapy*, and *The New Zealand Society for Music Therapy Journal* (Brooks, 2003). A recent meta-analysis of music therapy studies comparing music to no-music conditions (Whipple, 2004) found that all music therapy was effective across a variety of behavioral goals and treatment conditions for individuals with autism. All studies included in the meta-analysis used experimental treatment designs and included quantitative data sufficient to produce an effect size. In addition, a recent study conducted at The Cleveland Music School Settlement tracked client progress toward established goals and found that 100% of clients with autism met objectives in their primary goal areas within the first year of treatment (Kaplan, 2005).

While research in music therapy is very promising and appears to be moving in the direction of increased rigor and application of practices that will limit subjectivity, continued research needs to be conducted if music therapy will ever be lifted out of the “gray area” of possibly efficacious treatments to research-validated practice (Simpson, 2005). Given the positive response of many children with autism to music therapy, this research has great potential and importance.
Purpose of the Study

The fundamental purpose of special education is “instructionally based intervention designed to prevent (early intervention), eliminate (remedial instruction), and/or overcome (compensatory instruction) the obstacles that would otherwise keep an individual with disabilities from learning and from full and active participation in school and society” (Heward & Dardig, 2003, 1). The purpose of this study was to determine whether music therapy can effectively meet the purposes of special education practice as a complementary therapy. Because social skill deficits can present major obstacles to learning, this study specifically examined the effectiveness of music therapy intervention in promoting prosocial behavior of students with ASD and developmental disabilities.

Research Questions

The primary research question was “What are the effects of music therapy on three targeted social behaviors of students with ASD?” The three behaviors that were targeted were screaming, hitting, and asking. It was expected that screaming and hitting would decrease and that asking would increase as a result of music therapy intervention.

A secondary research question dealt with the social validity of music therapy. Specifically, how do secondary consumers, teachers and parents, perceive the goals, procedures, and outcomes of music therapy implemented with children with ASD and developmental disabilities?
Definition of Terms

Interobserver agreement – the extent to which data collected by two independent observers is in agreement.

Internal validity – the extent to which outcomes of a study are related to manipulation of independent variables and not to other, extraneous factors.

Multiple baseline across participants – a single subject research design that introduces subjects to a study one at a time. Each subject remains in baseline phase until they enter the study, producing a staggered effect that creates opportunity to demonstrate a causal relationship.

Music therapy – a systematic process of intervention wherein the therapist helps the client to promote health, using music experiences and the relationships that develop through them as dynamic forces of change.

Patschen – tapping hands on thighs or knees in the rhythm of a song.

Point-by-point agreement – a method of determining interobserver agreement that involves the following formula:

\[
\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100
\]

Procedural fidelity – the extent to which experimental/treatment procedures are consistently followed from one session to the next.

Rotating partial interval observation – a data collection system in which observers rotate between observation subjects for equal amounts of time. Because it is a partial interval recording system, if the behavior occurs at least once during the interval it is recorded as an occurrence for that interval regardless of how many times the behavior occurs during the interval.
Social story – a technique for teaching social skills to children with autism that involves creating stories that provide literal explanations of required social behavior.

Social validity – the extent to which an intervention has relevance to society in terms of perceived value, functionality, and outcomes.
CHAPTER 2

REVIEW OF THE LITERATURE

A variety of studies have been published addressing both the general effectiveness of music therapy and its specific effects on prosocial behavior. Research studies most closely related to the use of music therapy intervention for individuals with autism and developmental disabilities will be discussed.

General Effectiveness of Music Therapy

The music therapy research base supports the effectiveness of music therapy in addressing a wide variety of developmental skills within the special education context for school age children with disabilities (Jellison, 2000; Whipple, 2004; Kaplan, 2005). Several key areas will be discussed.

Learning and Recall

Several studies support the effectiveness of music interventions in promoting learning and recall of information. In a within-subjects study, Wolfe and Horn (1993) found that ten 5-year-old students in a Head Start preschool program learned telephone numbers faster when they were set to familiar melodies than if they were set to unfamiliar melodies or taught under spoken conditions. Additionally, fewer verbal prompts were required under the familiar melody condition. Effects were observed for immediate recall only, and retention of learned telephone numbers did not appear to be affected.
Similar effects were found in another within-subjects design study comparing the effectiveness of music and speech versus rhythm and speech in teaching 14 manual signs to ten 4-9 year old children with autism (Buday, 1995). Statistical analysis revealed that the music and speech condition was more effective than the rhythm and speech condition on the number of correctly imitated signed and spoken words for all subjects.

Thus, the music therapy literature tentatively supports the use of music to enhance learning and recall in school age children and as a potential approach to teaching communication skills. Music education literature provides stronger support for the application of music to promote learning and recall, which will be discussed further.

On-Task Behavior

The effectiveness of music therapy in promoting on-task behavior has also been addressed in the literature. In a descriptive study, Standley & Hughes (1996) found that student levels of on-task behavior and correct responses during 30 minute music therapy sessions in an inclusive preschool (n = 33) were equivalent to the highest levels reported in the research literature. In this study, fourteen observers recorded data on the Student On-Task Observation Form while watching video observations of sessions. Interobserver agreement reached 85%. Additionally, active student engagement was maximized by relying on the music to facilitate transitions and effectively reduce preparatory time (e.g., direction-giving), and teacher/aide interactions with students were significantly more positive or neutral than negative. A curriculum content analysis revealed that, in addition to providing many opportunities for student response, music therapy intervention targeted a wide range of skills and concepts suitable to the wide variety of students in the inclusive program.
In a single case study investigating on-task behavior, Jellison (1995) found that a girl with mild mental retardation was more on-task than off-task in both music education and music therapy, but levels of on-task behavior were higher in music therapy (On-task total in music education = 43%; music therapy = 69%). On-task behavior was defined as looking in the direction of the teacher or therapist, other individuals, materials, or equipment when directed. Data was recorded using a computer coded recording system.

Gunter and Fox (1993) found that vocalizations, mouthing, and task performance decreased and on-task performance increased when music was applied as reinforcement for a 14-year-old male with autism. Music was effective as reinforcement when applied either contingently or non-contingently, but it was slightly more effective when applied contingently. The study was conducted in the vocational setting, the academic setting, and in the hallways and lunchroom. Applications of music were effective in all settings, with slight variations in degree of effectiveness. Contingent music was particularly effective in the vocational setting. Additionally, interviews of teachers revealed high social validity to the use of music as reinforcement.

Music therapy was found to be effective in increasing the on-task behavior of children with learning disabilities (Colwell & Murlless, 2002). In a comparison of two music conditions (singing and chanting) and a non-music condition, both music conditions were found to be more effective in increasing on-task behavior, defined as verbal/motor behavior that follows the classroom rules and is appropriate to the learning environment, than the non-music condition. However, this study used a convenience sampling; therefore, it was quasi-experimental.
The promotion of both on-task behavior and learning and recall for school age students are considered to be basic assumptions in the field of music therapy (Bruscia, 1998; Wilson, 2002). Although the music therapy literature supports the effectiveness of music therapy in promoting on-task behavior and learning and recall of students with a wide variety of disabilities in both group and individual settings, the research is not of the most compelling nature. To find stronger support for these assumptions, it is essential to look at the music education research base.

In the field of music education, a wealth of literature including research of high integrity exists to support the concept that music promotes learning, memory, on-task behavior, and academic achievement (Schellenberg, 2004; Vaughn, 2000; Gardiner, Knowles, and Jeffrey, 1996). For example, Schellenberg (2004) found that 132 six-year-olds participating in weekly music lessons for 36 weeks gained 6.1 IQ points if they were involved in keyboard lessons and 7.6 points if they were involved in voice lessons. Keyboard and voice lessons were the two experimental groups and drama lessons and no lessons were the two control groups. This study is considerably rigorous, involving random assignment of a large sample of children.

Likewise, Gardiner, Knowles, and Jeffrey (1996) sampled 96 under-achieving students in first grade classrooms in four public schools, providing a robust sample size and a wider setting. The experimental group participated in a “test arts” program that targeted sequenced skill development, while the control group participated in the standard arts curriculum. When standardized scores before and after participation were compared, students in the test arts program, who had lagged behind their peers, had caught up to them in reading and surpassed them by 22 percent in mathematics. In addition, teachers
rated the students higher on attitude and behavior scores after their participation in the program. The study was replicated the following year on a different sample of students with similar results.

Participation in music programs is positively correlated with improved academic performance and better adjustment to the social climate of school. For example, SAT test takers were found to score 57 points higher on verbal and 41 points higher on math if they studied music performance. Students who studied music appreciation scored 63 points higher on the SAT verbal and 44 points higher on the SAT math (College-Bound Seniors National Report, 2001). Students who participate in music were also found to receive more academic honors and awards than non-music students, and they made up a higher percentage of A and B students than their non-music peers (NELS: 88 First Follow-up, 1990). A two-year study done in Switzerland sampled 1,200 children in 50 schools and found that children involved in music programs learned to read more easily, had better language skills, enjoyed school more, had lower stress levels, and improved social climate (Weber, Spychiger, & Patry, 1993).

Although music education and music therapy are two distinct fields, there is clearly a sound rationale for student participation in music programs of any sort. Although some music education studies include students with special needs, the majority focus on students without disabilities. There is a need for more sound research designs to investigate whether participation in music programs is as important academically and socially for students with special needs as it is for students without disabilities. Because music therapy is specifically equipped to address the needs of students with disabilities, high integrity research needs to be conducted from the perspective of music therapy.
Effects of Music Therapy on Specific Goal Areas

Although general music therapy programs can be effective in meeting the wide range of student needs in inclusive settings, several studies have found that music therapy programs targeting specific developmental goals may be more effective than programs that focus on all areas of development (Register, 2001; Humpal, 2001; Standley & Hughes, 1997). For example, in a comparison of a music therapy curriculum targeting prereading/writing skills versus a general music therapy program focusing on all areas of development, Register (2001) found that children in both programs showed improvement in prereading/writing skills, but children in the program that targeted those skills showed the most improvement on standardized prereading/writing assessments. Register’s study employed a quasi-experimental pretest – posttest control group design to study a convenience sampling of 50 subjects in four preexisting preschool classes for an entire school year. It was a replication of an earlier study conducted by Standley and Hughes (1997) that found music therapy treatment to be more effective than no music therapy treatment on the same standardized assessments but with a smaller sample size (n = 24) and for a shorter period of time (15 weeks).

Communication and Social Skills

Students with autism and developmental disabilities often require direct instruction in social skills. Music therapy programs have been individualized to meet this need.

In a single subject case study, Wimpory, Chadwick, and Nash (1995) found that Musical Interaction Therapy (MIT), a specific form of music therapy, was successful in increasing positive social interactions (i.e., social acknowledgement, eye contact, child-initiated interaction, child’s positive changes to interaction, and symbolic play) between a
mother and her 3 year old daughter with autism. An ABC design was used in which treatment phase A was baseline, phase B was MIT, and phase C was a follow-up occurring two years later. All data was collected from video recordings of free play occurring outside of MIT. Gains made during MIT were maintained two years later at follow-up, and an overall decrease in social withdrawal was observed.

Using Nordoff-Robbins Creative Music Therapy (1977), another improvisational music therapy method, Edgerton (1994) found that the scores of eleven 6 to 9 year old children with autism on the Checklist of Communicative Responses/Acts Score Sheet (CRASS) improved following music therapy intervention. Edgerton used an ABA reversal design. Significant differences were found between the first session CRASS scores and the last session CRASS scores, and substantial decreases in CRASS scores occurred during the reversal condition for all 11 children.

Ma, Nagler, Lee, and Cabrera (2001) found communication increases in expressive language, receptive language, motoric/gestural language, and interaction abilities for six preschool age children in an early intervention program following group music therapy activities meant to increase communication skills. Improvement was measured on an observation rating scale that was scored before the first session and again after six music therapy sessions, making this a pretest/posttest comparison study without random assignment of subjects.

In a doctoral dissertation, O’Laughlin (2000) employed an ABA withdrawal design comparing music to no music treatment conditions to investigate the effects of typical language therapy plus a music stimulus on preliguistic communication behaviors (i.e., eye contact, looking and pointing at a stimulus, peer engagement, and imitations of
talking and singing). Subjects were 44 children with autism ages 3 to 10. Attention (i.e., eye contact and pointing to stimulus) increased during the music treatment condition; respondent observations indicated improved prelinguistic and generalized behaviors in the music treatment condition over the no music treatment condition.

Recent studies tend to focus on the use of music therapy in inclusion programming as a medium to promote interaction between students with disabilities and their typical peers (Humpal, 2001; Kern & Aldridge, 2006; Gunsberg, 1988). For example, Humpal (2001) individualized a program targeting social skill development and investigated its effectiveness for 15 preschool age students from a typical preschool and 12 students with mental retardation from a developmental center. The goal of the study was to foster interactions between the students with mental retardation and their typical peers. Social interaction was defined as selecting a partner within 10 seconds of the directive, “Choose a partner,” and an observer recorded whether students selected a partner from their own school, from the other school, or no partner after 10 seconds on pretest and posttest observations. Posttest measures revealed that selection of a partner from the another site increased from 7% to 46%. Overall interaction with partners from either site rose from 69% to 93%, and percentage of students who selected no partner decreased from 31% to 7%. In follow-up surveys, staff at both sites reported increased peer interaction and rated the music therapy interventions as highly effective in promoting peer interaction. Humpal discusses implications for increasing acceptance of diversity in young children.

Kern and Aldridge (2006) conducted a multiple baseline across participants study that included four 3- to 5-year-old boys with autism. The study investigated the effect of a Music Hut installed on the playground and subsequent teacher-led and peer-mediated
interactions with the subjects on increasing peer interaction and meaningful play on the playground. Results showed that the Music Hut itself was not effective in increasing peer interactions and meaningful play, but when teachers were trained by the music therapist to facilitate musical interactions between students in the Music Hut, those interactions increased significantly. When peers were trained to facilitate those interactions, they increased as well, though not as drastically as with the teacher-mediated intervention.

Gunsberg (1988) also addressed social relationships between developmentally delayed children and their typical peers. Specifically, Gunsberg studied the effects of Improvised Musical Play (IMP) on time engaged in social play between nine developmentally delayed children and three of their typical peers. All children were ages 3 to 5 \( \frac{1}{2} \) years. Time engaged in play was three times longer than expected in terms of current research of the time when IMP was implemented. Although qualitative differences were found in the play of delayed and nondelayed children, the value of the IMP method was that all children were able to participate regardless of their differences.

**Social Stories**

Recently, several studies have investigated the use of social stories set to song as a specific music therapy intervention for social skill development. In 2004, Pasiali conducted an ABAB reversal study investigating the effectiveness of sung social stories on the target behaviors (i.e., asking for a snack, using a quiet voice during dinner, watching videotapes without forwarding or rewinding) of three 7- to 9-year-old children with autism. The researcher presented music therapy intervention prior to the time of day when targeted behaviors were likely to occur, and the participant's parents were then responsible for data collection immediately following music therapy intervention.
inspection of data indicated a decreasing trend in the target behaviors for all three participants; however, statistical significance was reached across all treatment phases for only one participant. Many confounding variables were presented as a result of the difficulty in controlling all of the possible variables in the home setting.

Brownell (2002) also investigated the application of musically adapted social stories with students with autism. Using an ABAC/ACAB single subject design to compare the effects of read social stories to sung social stories, Brownell found that both interventions were more effective than no intervention for four first and second grade children with autism. Statistical significance indicating that social stories set to music were more effective than read social stories was found for only one participant. Results approached significance for one additional participant. Like Pasiali, Brownell recorded frequency of target behaviors (i.e., TV talk, following directions, using a quiet voice) during a 1-hour period of time following intervention. Although this study was conducted in the school setting, many confounding variables were presented, including influences of happenings at home. Although Brownell did not conduct a social validity survey, he anecdotally mentions the affinity the students had for the music treatment condition and its apparent assistance in promoting spontaneous recall of the information contained in the songs. In addition, although a treatment order effect was not observed, the frequency of the target behaviors was consistently lowest during music conditions for all four students.

Autism and Neurological Responses to Music

A growing body of research in numerous disciplines including neuroscience, neurology, music therapy, audiology, and psychology, has established evidence that the
typical human brain possesses an innate capacity to process music and that musical stimuli affects emotional, physiological, communicative, social, and physical aspects of human behavior (Davis, Gfeller, & Thaut, 1999).

A significant body of research has also established that people with autism have unique music processing abilities. In their review of literature, Mottron, Peretz, and Menard (2000) report on a body of previous research indicating that, despite pervasive communication impairments, individuals with autism display a natural response to musical stimuli over verbal stimuli. Their ability to process musical stimuli may even be enhanced relative to most persons. The small population of savant individuals with autism demonstrates phenomenal pitch processing abilities such as absolute pitch and long-term memory for musical stimuli that may exceed that of professional musicians. This savant ability is seen as an exaggeration of ability in the population of individuals with autism at large. Research into the specific reason why individuals with autism may have enhanced pitch discrimination abilities has revealed that superior absolute pitch, a local processing function, may account for this difference. Individuals with autism also tend to excel in other forms of local processing in the visual modality and in the discrimination of very similar novel stimuli (Mottron, Peretz, and Menard, 2000).

Thus, neurological research indicates that music is one particularly effective means of communicating with individuals with autism. In particular, goal-directed clinical interventions in the form of music therapy are recommended (Trevarthen Aitken, Papoudi, and Robarts, 1998).
Themes of the Literature

The literature presents justification for the application of music therapy as a treatment for individuals with autism and developmental disabilities. Studies suggest a positive relationship between music therapy intervention and progress in social skill development for school age children. However, many studies do not present strong statistical significance due to a variety of confounding variables. Studies using a larger sample size and group experimental research designs tend to be more rigorous; however, lack of funding and the nature of music therapy as an individualized method of intervention make single subject research more accessible and more feasible. Hillecke, Nickel, and Bolay (2005) discuss the necessity of employing a variety of research designs, including both single subject and group experimental, to effectively investigate the various factors involved in music therapy practice. Because clinical practice in music therapy is often highly individualized, the single subject research design remains an effective method of investigating specific independent and dependent variables that are most appropriate for individual research subjects.

The current study used a single subject multiple baseline across participants research design to evaluate the effects of music therapy on communication and social skills for children with autism. Although a large sample size was not possible for the purposes of this study, several measures were taken to ensure internal validity of the study. For example, interobserver agreement and procedural fidelity checks were used to make data collection as objective as possible. The effects of music therapy were examined immediately after therapy sessions, making the data more relevant in terms of analyzing the effects of music therapy on social skills outside of the music therapy session. In
addition, this study targeted both negative and positive social behavior, providing data on the effects of music therapy in both increasing positive responses and decreasing negative responses. Several techniques that were found to be effective in the literature were used, including social stories, interventions targeting social interaction, and session structuring techniques.
CHAPTER 3

RESEARCH METHODS

Participants and Setting

This study took place at a private, non-profit day school for children with disabilities located in a city in the Southwestern United States. Approval from the University of Nevada Las Vegas Institutional Review Board (IRB) was obtained on December 12, 2006, prior to beginning this research. Five school-age students were selected for participation in the intervention, although only three of the participants were in the actual study. The two additional students participated in order to provide an opportunity for participants to interact socially. Inclusion criteria were student ages (range, 3 1/2 - 7) and potential to benefit from social skills training as reported by the executive director of the school.

In cases where music therapy services are provided as part of a student’s Individualized Education Program (IEP), it is common for teachers, administration, and/or parents to refer students for a formal music therapy assessment based upon two factors; namely, needs in a specific area such as social skills and enjoyment of music. Typically, in a public school setting, students would only be selected for participation in individual or small group music therapy if the results of the assessment indicated that music therapy was a required service for the student to meet goals on his/her IEP. This study did not include a formal music therapy assessment because of time restrictions for
completion. However, it is not uncommon for music therapists to be employed contractually by both private and public school systems to provide group music therapy services for entire classrooms or predetermined groups of students, in which case, a formal music therapy assessment would not occur. Thus, the lack of formal assessment in this study resembles the group music therapy service provision model (Wilson, 2002).

Students who participated in the study are described as follows. Eddie was 5.1 years old at the time of the study, and he was eligible for an (IEP) in the Developmentally Delayed category. He had a formal medical diagnosis of ADHD and OCD, a speech-language pathology assessment conducted in 2001 revealed a phonological speech delay, and his adopted mother reported that his biological mother abused alcohol and drugs during the pregnancy. Jack was 6.7 years at the time of the study. He had no formal diagnosis of mental or physical disability; however, his records indicated frequent behavior problems and difficulty interacting positively with peers. His parents chose to send him to the special school because he had been kicked out of two community preschools. Ivan was 6.4 years and had a formal diagnosis of Asperger’s Syndrome and Attention Deficit – Hyperactivity Disorder, Combined Type.

The two students who participated in the intervention but not in the actual study are described as follows. Gabie was 3.10 years of age and had no formal diagnosis. The director of the school said she was being observed to rule out autism due to a family history of the disorder. Roger was 4.10 years of age and had a diagnosis of bipolar disorder.
## Table 1

*Demographic Information*

<table>
<thead>
<tr>
<th>Student</th>
<th>Age</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eddie</td>
<td>5.1</td>
<td>ADHD, OCD, phonological speech delay</td>
</tr>
<tr>
<td>Jack</td>
<td>6.7</td>
<td>Behavior difficulties</td>
</tr>
<tr>
<td>Ivan</td>
<td>6.4</td>
<td>Asperger’s Syndrome, ADHD – Combined Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-participants</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gabie</td>
<td>None</td>
</tr>
<tr>
<td>Roger</td>
<td>Bipolar disorder</td>
</tr>
</tbody>
</table>

The study occurred in two settings within the school, a multipurpose room for the music therapy sessions and a classroom for the behavioral observations following music therapy. A 10’ X 10’ multipurpose room, used primarily for one-on-one therapy, was the setting for the music therapy intervention sessions. The room contained a carpet with colored squares, small children’s chairs, a long table, two student desks, and a bookshelf. Behavioral observations following music therapy were conducted in the students’ classroom, a 30’ x 15’ room with student desks, several bookshelves, and a carpeted area for centers. Observations occurred in the centers area, which included costumes, cars, a doctor play set, a kitchen area, a reading center, games and puzzles, and blocks.
Materials

Musical instruments used to conduct music therapy in the study included a full size guitar, a small children's play guitar, a small maraca, jingle bells, hand drums, Boomwhackers, scarves (used for dancing), wood blocks, tambourines, a djembe, and pitched bells. A CD player was used with the following three CDs: *Musical Scarves and Activities, Kids in Motion* by Greg and Steve, and *Tuned in to Learning Volume 1: Social Skills and Pragmatics for Autism and Related Needs*. Stickers and marshmallows in addition to certain instruments were used as reinforcers for appropriate behaviors throughout the music therapy session when needed. A super student award, consisting of a small square of paper saying *super music student* with stickers, was given to the student with the best behavior after each session.

During the behavioral observations that occurred immediately after each music therapy session, data collection sheets (see Appendix A), clipboards, pencils, a 10-second interval tape recording, and a tape player were used. Additional documents used were a therapist-made child personal history form, an IRB approved parental consent form, and parent and teacher social validity surveys adapted from Tincani (2004) (see Appendix B).

Dependent Variables

The dependent variables in this study were hitting, screaming, and asking. Prior to the study, teachers were informally interviewed about which student behaviors were most problematic and which behaviors required improvement. Hitting, screaming, and asking were chosen because they were the behaviors reported as most problematic by classroom teachers and they were the behaviors observed to be in most need of intervention by the
researcher. Specifically, it was reported that hitting and screaming occurred at unacceptably high rates, while appropriate asking occurred at unacceptably low rates.

Hitting was defined as touching another person or object with excessive physical force. Screaming was defined as vocalizations that are medium to loud in intensity (i.e., loudly stating “Nooo,” “Aaah,” or “Stop,” etc.), and asking was defined as any verbalization that is a question (i.e., “Can I go to the bathroom,” “What are you doing,” “Who are you,” etc.). It was expected that implementation of music therapy would coincide with a decrease in hitting and screaming and an increase in asking.

Observation and Recording Procedures

Behavioral observations occurred immediately following music therapy sessions. Students were observed during a 10-minute free-play period immediately following therapy. The 10-minute period occurred at the same time each day, from 11:20 am to 11:30 am, immediately before lunch and recess. During free play, students were able to engage in a variety of unstructured play activities, such as dress-up, reading, playing with cars and blocks, playing with a doctor toy set, and playing in a toy kitchen, with minimal supervision from staff. Prior to baseline and intervention, the experimenter instructed staff to pay minimal attention to challenging or appropriate behaviors during free-play to reduce the effects of extraneous variables (e.g., reprimands, praise statements, prompts) on dependent variables. Staff members were instructed to engage students only when they engaged in serious inappropriate behaviors that posed a threat to safety or property.

A rotating partial interval recording procedure was used, in which the first student, Eddie, was observed during the first 10 seconds, the second student, Jack, was observed
during the next 10 seconds, and the third student, Ivan, was observed during the next 10 seconds, and so on. If any of the three behaviors occurred one or more times during any portion of the interval, the observer(s) circled the corresponding letter. The letters H, S, and A appeared in each box, representing the words hitting, screaming, and asking, respectively. The recording system allowed for each student to be observed for twenty 10-second intervals during each observation. At the conclusion of ten minutes, total number of intervals with each behavior was tallied and total percentage of intervals with each behavior was calculated. To assist the observer(s) in keeping track of the 10-second intervals, a tape recorder with a dual headphone jack was used to play a tape in which a beep occurred at the end of each 10 second interval, until the session ended.

Interobserver Agreement Procedures and Data

Two doctoral students assisted with interobserver agreement (IOA). They participated in a brief training period, which consisted of collecting data during 10-minute observation periods and comparing data with the author after each observation. The IOA assistants and the author then discussed interpretations of actual observed behaviors in relation to the predetermined definitions of the target behaviors. The assistants completed training when interobserver agreement reached 80% for one observation period.

IOA data was collected during the 10-minute observation periods for six of the 24 sessions (25%). IOA was calculated using the point-by-point agreement method (Kazdin, 1982) as follows:

\[ \text{Agreements} \times 100 \]
\[ \frac{\text{Agreements} + \text{Disagreements}}{24} \]
Agreement between observers on all three students' behaviors scored during each interval was required for the interval to count as an agreement. Results are as follows: IOA for Eddie averaged 96% (range, 90-100), IOA for Jack averaged 96% (range, 85-100), and IOA for Ivan averaged 98% (range, 90-100).

Experimental Design

A multiple baseline across participants design (Kennedy, 2005) was used to evaluate research questions regarding the efficacy of music therapy. To increase the effectiveness of music therapy intervention, participants were placed in groups of three to five peers on the basis of similar goal areas during music therapy sessions. Baseline and intervention phases were staggered for each participant in the study. During sessions one through six, baseline data on targeted behaviors were collected for all participants. During session seven, participant one, Eddie, began music therapy intervention with two peers while the other participants remained in the baseline phase. During session 12, participant two, Jack, began music therapy intervention and Eddie continued music therapy intervention while participant three remained in the baseline phase. Finally, during session 17, participant three, Ivan, began music therapy intervention, and Eddie and Jack also remained in music therapy intervention. The two peers who were not included in the study remained in the music therapy group throughout the study. All participants remained in intervention until session 23.

A maintenance check was completed (session 24) three weeks after intervention stopped. Data collection occurred as usual during the maintenance check, but no intervention occurred.
Experimental Procedures

Baseline

During baseline, participants were observed and behavioral data was collected during 10-minute periods of free center play. No music therapy intervention occurred at any point during the baseline condition.

Intervention

Music therapy was implemented by the researcher, a board certified music therapist (MT-BC). When music therapy intervention began, it occurred immediately before centers time when data was collected. The intervention consisted of a variety of songs, movement activities, instrumental activities, and games designed specifically to target hitting, screaming, and asking behaviors (see Appendix C for a sample session).

Each session began with a Hello song. Initially, the song was Hello, Everybody sung to the tune of Goodnight, Ladies. Students tapped their legs using patchsen (e.g., tapping hands on thighs or knees in the rhythm of the song) while singing the song. Each child was given an opportunity to strum the guitar while his/her name was sung. The goals for this song were orientation to the music therapy group and peer awareness. In session 14, the hello song was changed to a new song titled How Ya Feelin’ Today? This song gave each child an opportunity to ask a peer how they were feeling, presenting more of a challenge for participation in the greeting. Goals for this song were orientation to the group, peer awareness, and asking questions.

After the hello song, students participated in some type of movement activity. An example is the Freeze Dance on Greg and Steve’s Kids in Motion CD. For this dance, students were required to find a peer and ask them “Will you dance with me?” This
activity provided an opportunity to ask a question and to engage in safe physical contact, targeting the hitting behavior. Another example is You Gotta Sing, a movement song in which students held hands and performed various movements around the circle, such as tiptoeing, marching, swinging arms, skipping, etc. This activity gave each student an opportunity to contribute a movement idea and focused on peer awareness and safe physical contact, such as not hitting.

After movement activities, students chose instruments and participated in guided instrumental activities. For example, a song entitled Pass It Along gave students an opportunity to practice sharing instruments with other students, again focusing on decreasing hitting and screaming behavior, most of which occurred when students were required to share items in the regular classroom. Another song used was Can You Find a Friend? This song required students to find a friend who had the instrument named in the song and ask that friend to share their instrument. Goals included asking questions and decreasing hitting and screaming when sharing.

Following movement activities, students engaged in singing. Five of the songs were modified social stories (Brownell, 2002) set to music that were created by the researcher. Social stories were created by first choosing one of the three behaviors targeted in the study. Then, a familiar tune was chosen for the song. The researcher then fit lyrics appropriate to the topic into the rhythm of the familiar melody. Descriptive and perspective statements were primarily used in the songs as recommended by Gray (1997). An example is Can I Play with You Today?, a song written to the tune of It's a Small World, targeting peer awareness and asking questions. Friends Tap Gently and Tap Your Neighbor's Hand were songs targeting decreases in hitting behavior.
Although not a social story by definition, *Loud and Quiet Journey* was another song used in sessions. This song/activity targeted screaming behavior by engaging students in practicing loud and quiet voices.

Finally, a goodbye song closed out each session. On most occasions, the goodbye song reviewed what was learned in that session by asking each student to name something s/he learned. Visual prompts were provided to assist students in remembering. Several times a shorter goodbye song was used if time was limited because other parts of the sessions required more time.

During the session, several reinforcers were used to maintain good behavior, including instruments, marshmallows, stickers, and the super music student award given to one student for best behavior after each session. In addition, prompting and error correction procedures were frequently performed by the therapist to assist students in learning appropriate responses. On a few occasions, when severe behavior problems occurred, students were placed in time out.

*Maintenance*

A maintenance check was conducted 3 weeks after the intervention ended. Only one session was included in the maintenance phase of the study due to time limitations for completion of the research.

*Treatment Fidelity Procedures and Data*

A checklist was used to maintain procedural fidelity throughout each music therapy session (see Appendix D). Before each session, the researcher checked the session plan for compliance with the procedural fidelity checklist. In addition, video recordings of six
sessions were viewed by a doctoral student assistant to check for procedural fidelity. The experimenter completed 100% of the steps on the self-completed checklist. Interobserver agreement with the secondary observer on the checklist was also 100%.
CHAPTER 4

RESULTS

Dependent Variables Across Each Subject

Three different dependent variables, hitting, screaming, and asking were targeted in this study. Participants displayed varying rates of hitting, screaming, and asking during baseline. Compared to baseline, music therapy produced gradual yet marked decreases in hitting and screaming and increases in asking. Intervention effects maintained three weeks after intervention. Specific results for each dependent variable are as follows.

The first dependent variable was hitting. Eddie was the first participant to begin the intervention phase of the study. In baseline, the percentage of intervals during which Eddie hit averaged 10% (range, 0 - 25), and during intervention that average decreased to 2.5% (range, 0 - 10). Jack entered the intervention phase next. Jack’s average percentage of intervals engaged in hitting during baseline was 9% (range, 0 - 25), and his average percentage of intervals of hitting during intervention reduced to 0.4% (range, 0 - 5). Finally, Ivan entered the study. Ivan’s average percentage of intervals of hitting during baseline was 1.1% (range, 0 - 10), and his average percentage of intervals of hitting during intervention decreased to 0%.

Screaming was the second targeted behavior. Eddie’s average percentage of intervals of screaming during baseline was 10.8% (range, 0 - 20), and his average percentage of intervals of screaming during intervention decreased to 5.7% (range, 0 - 20). Jack’s
average percentage of intervals of screaming during baseline was 8% (range, 0 – 25), and his average percentage of intervals of screaming during intervention reduced to 0.8% (range, 0 – 5). Ivan’s average percentage of intervals of screaming during baseline was 1.7% (range, 0 – 15), and his average percentage of intervals of screaming during intervention decreased to 0%.

Asking was the third targeted behavior. Eddie averaged 0% of intervals of asking during baseline, which increased to 3.7% (range, 0 – 10) of intervals of asking during intervention. Jack’s average percentage of intervals of asking during baseline was 0%, which increased to 3.3% (range, 0 – 20) during intervention. Ivan’s average percentage of intervals of asking during baseline was 3.8% (range, 0 – 15), and his average percentage of intervals of asking during intervention increased to 10% (range, 0 – 20).

Maintenance Check

A maintenance check was completed during session 24, which occurred 3 weeks after the completion of the intervention sessions. The maintenance check indicated that decreases in hitting and screaming continued after withdrawal of the intervention.

During the maintenance check, Eddie, Jack, and Ivan did not engage in hitting or screaming for any of the observation intervals. They did, however, engage in asking. Eddie’s frequency of asking was 10%. Jack’s frequency of asking was 15%, and Ivan’s frequency of asking was 10%.
Table 2

*Hitting, Screaming, and Asking Averages*

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<th>Maintenance</th>
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<tr>
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<td>5.7 (0-20)</td>
<td>0</td>
</tr>
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<td>Asking</td>
<td>0</td>
<td>3.7 (0-10)</td>
<td>10</td>
</tr>
<tr>
<td>Jack</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hitting</td>
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<td>0.4 (0-5)</td>
<td>0</td>
</tr>
<tr>
<td>Screaming</td>
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<td>0.8 (0-5)</td>
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</tr>
<tr>
<td>Asking</td>
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<td>3.3 (0-20)</td>
<td>15</td>
</tr>
<tr>
<td>Ivan</td>
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<td></td>
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<td>Hitting</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Screaming</td>
<td>1.7 (0-15)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asking</td>
<td>3.8 (0-15)</td>
<td>10 (0-20)</td>
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</tbody>
</table>

*Note.* Numerical values represent average percentage of intervals in which the behavior occurred. Numerical values enclosed in parentheses represent the ranges for the percentage of intervals in which the behaviors occurred.
Baseline  Music Therapy  Maint.

Eddie

25  20  25

c  c  c

Jack

25  20  20

c  c  c

Ivan

20  20  20

c  c  c

Percentage of 10-s Intervals - Hitting

Session

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Social Validity Surveys

Teacher Social Validity Feedback

Two out of four teacher surveys were returned. Both surveys were very positive. Both mentioned the importance of music therapy as an engaging medium for learning that promotes group cooperation and communication skills. Both reported positive changes in the behavior of participating students, including more positive interactions with peers and teachers and an increased ability to focus on academics after sessions. One teacher reported disliking that not all students could participate in the study due to the research design. She reported that it was difficult to explain to the other students why they could not participate, and it was difficult to keep their attention after the participants left the classroom to go to the music therapy room. The other teacher reported the only negative aspect was that music therapy was discontinued after the study.

Parent Social Validity Feedback

Two of the five parent surveys were returned. Results were mixed. Gabie’s mother reported that she did not notice any difference in Gabie, a non-participant in the study. She commented that she did not know enough about the study and that she wished there would have been more communication with the parents throughout the study. Ivan’s father reported that he noticed “improved attention span and self-monitoring skills which has resulted in expanded social interaction with peers, educators, and his parents.” The aspect of the study he like the least was that it couldn’t be “integrated more widely across the curriculum” due to the short-term nature of the research study. See appendix B for copies of the teacher and parent social validity surveys.
CHAPTER 5

DISCUSSION

The primary research question in this study was “What are the effects of music therapy on three targeted social behaviors of students with ASD and developmental disabilities?” It was found that music therapy had a positive effect on the social behavior of the students in this study. After music therapy intervention, decreases in hitting and screaming behavior and increases in asking behavior were observed upon visual inspection of data. Inspection of frequency averages for baseline and intervention phases also suggested decreases in hitting and screaming and increases in asking after music therapy intervention. This research suggests that music therapy that is targeted on decreasing negative behaviors while increasing more positive replacement behaviors is at least moderately effective for students with ASD and developmental delays.

The last participant to enter the study, Ivan, had very low levels of hitting and screaming behavior prior to intervention; therefore, a drop in this behavior was not seen during intervention because it was already very low. This fact makes it difficult to determine a causal relationship between music therapy and decreases in hitting and screaming behavior. In addition, levels of all of the students’ behavior varied greatly from day to day, making it difficult to achieve trend lines, and therefore, to draw causal conclusions for all three behaviors. Nonetheless, the gradual decreases in problem behaviors observed for Eddie and Jack and increases in appropriate behavior for all three
participants tentatively suggests a positive relationship between music therapy and improvements in social skills during the study.

The intervention produced more positive changes in Eddie and Jack than in Ivan. This may be due to Ivan's late entry into the group and the fact that his baseline level of hitting and screaming was already low. However, by the last session of intervention Ivan demonstrated 20% of intervals engaged in asking, a level higher than any session observed during baseline. Thus, music therapy appeared to be beneficial for Ivan despite his absence of challenging behaviors throughout the study.

A maintenance check was conducted three weeks after the completion of the intervention phase, and it was found that students maintained the behavioral results of this intervention at approximately the same levels as the last intervention session. This finding is very positive, especially in terms of the difficulty students with ASD and other disabilities often have in maintaining previously learned behavior.

The secondary research question was, "How do secondary consumers, teachers and parents, perceive the goals, procedures, and outcomes of music therapy implemented with children with ASD and developmental disabilities?" Previous literature reveals very little about secondary consumers' perceptions about music therapy (Hilliard, 2001; Edgerton, 1994). Based on the two teacher surveys that were returned in the current study, teacher responses to music therapy were very positive. Teachers believe music therapy, as implemented in this study, provided an engaging medium for students to learn and practice social skills. Teachers observed more positive peer interactions and increased ability to focus on academics after music therapy intervention. However, the validity of these findings is limited due to the fact that teachers at the school assisted the researcher
in selecting participants and target behaviors. This may have impacted the results of the social validity survey because teachers had prior knowledge of the expected outcomes of the research. None of the parent surveys were returned, most likely because surveys were dispersed by the program director when parents came to pick up their children from school in the afternoon. Parents may have been in a rush at this time, and the program director most likely did not have time to ensure that the surveys were filled out and returned.

Anecdotal Observations

It is important to note that, as with all social sciences research, and in particular, single subject research, it is difficult to eradicate all of the possible extraneous variables that can come into play. One week prior to the onset of this study, Eddie went through a medication change. At school, teachers reported that his behavior was somewhat inconsistent during this time, possibly leading to some of the inconsistencies in the data. This would make the decreases in his levels of hitting and screaming and increases in his level of asking behavior even more remarkable in terms of the medication changes he was undergoing.

Additionally, a new teacher started working in the classroom one day before session nine, which is around the time hitting began to decrease for Eddie and Jack, screaming began to decrease for Jack, and asking began to increase for Eddie. This teacher supported the generalization of concepts learned in music therapy sessions to the classroom without any specific instruction by the researcher to do so. This brings up an interesting point. Children require consistency from one setting to another for optimal
learning. The addition of a teacher who supported positive social behavior in the classroom may have been the extra element needed for students to generalize what was learned in music therapy back to the classroom.

It is important to mention also the issue of introducing research subjects into an established music therapy group one at a time. Although these students all knew each other well because they were in the same classroom, the process of group members establishing a group identity and learning group rules and procedures was interrupted each time a new student entered the group. For example, the new student always required a few weeks before adjusting to the setting, learning the rules of the group, and becoming familiar with the music and interventions that were implemented. Likewise, the students already in the group required some time to adjust to the styles of interaction and behavior that each new student brought to the group. It is difficult to say how greatly this factor may have impacted the progress of the students, and it may account for the relatively gradual learning effects observed during music therapy intervention. Another aspect of the increasing group size is the decreasing therapist to student ratio as new students are added to the group. For students who required high levels of supervision, like Eddie, this could have had a negative effect.

Finally, an additional extraneous variable was the schedule of music therapy sessions. On some occasions, the researcher was unable to implement sessions, sometimes missing two or three sessions in a row either due to conflicting appointments or because students were absent from school. The inconsistency in the scheduling of music therapy sessions may have also had an impact on student progress, although these sorts of interruptions
were unavoidable and common to everyday educational settings, thus enhancing the
generalization of results to other educational settings.

Implications for Practice

This study lends additional support to the effectiveness of social stories set to music
as a music therapy intervention (Brownell, 2002; Pasiali, 2000). Although the music
therapy implemented in the current study consisted of a variety of interventions, social
stories were a large portion. Most music therapy sessions included at least two or three
social stories set to music.

This study also provides additional support for the concept that music therapy that is
targeted to a specific educational purpose is effective. (Register, 2001; Humpal, 2001;
Standley & Hughes, 1997). With the increase in accountability standards for all public
school teachers and therapists, the importance of implementing interventions that target
specific behaviors is increasing. This study provides a model of a behavior specific
music therapy program.

It is always important to remember that music therapy is not equally effective for all
children. This finding was also supported in the current study. Because of this, music
therapy assessments conducted prior to treatment are essential for determining student
response to treatment (Brunk & Coleman, 2000). As increasing numbers of music
therapists become employed in public schools, it is important to carefully consider which
children would benefit most from their services. Because music therapy is currently
considered a related service under IDEA, the process for determining need for services is
the same as for any other educational services provided by the school district. As with all
other educational service decisions, the decision that a student would benefit from music therapy services as part of his/her IEP should be made by the IEP team with the assistance of a formal music therapy assessment to determine the student’s response to treatment (Wilson, 2002). As this study demonstrates, tracking data can be very helpful in determining which students are benefiting most from a particular music therapy program.

The results of the social validity surveys suggest that music therapy is generally perceived to be favorable and effective by teachers and parents. However, as Gabie’s mother mentioned, there is a need for increased communication with parents.

Implications for Future Research

This study adds to the body of research on music therapy with children with autism. As music therapists continue to improve upon the quality of research and to discover research designs that best suit the needs of the practice, more attention must be paid to the development of high integrity research. This study involves a research design that limits the amount of extraneous variables and provides an opportunity to demonstrate a causal relationship. In future research, these two factors should be carefully considered when creating the research design.

It is also recommended that future research investigate the effects of a classroom teacher who reinforces concepts learned in music therapy on the effectiveness of music therapy. The music therapy sessions included in this study involved intense work on social skills that occurred during three 20 minute sessions per week. In comparison to the 40 or more hours per week students spent in the school in which the study was...
conducted, this is a relatively small amount of time. If skills learned in music therapy were reinforced throughout the week, students would be given more opportunity to practice and to generalize those skills. Collaboration between the music therapist and the classroom teacher seems necessary. It is recommended that this concept be investigated further.

It is also recommended that more music therapy studies include social validity surveys of secondary consumers. Surveys, especially in small numbers, are a relatively easy research method. They would add depth and relevance to any study by highlighting the opinions and observations of others.
APPENDIX A

SOCIAL BEHAVIOR RECORDING FORM
Social Behavior Recording Form

IOA: Yes No Session No. _______

Date: _______________________ Observer: _______________________

Experimental Condition (circle one): Baseline Intervention

A = Asking  S = Screaming
H = Hitting

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Total

Percentage % % %
Teacher Questionnaire*

Name: ___________________________ Date: __________________

1. After hearing a description of the study conducted, how important do you think the study is in terms of its contribution to teaching social skills to students with autism and developmental disabilities? Explain.

2. The study investigated the effectiveness of music therapy for teaching social skills to students with autism and related disabilities. How important are the results of this study to the intervention of students with autism and developmental disabilities?

3. Please describe any improvements in social skills you observed in children who participated in the study.

4. How has participation in this study affected your students?

5. Please comment on aspects of the study that you liked best.

6. Please comment on aspects of the study that you liked the least.

Parent Questionnaire*

Name: ___________________________  Date: __________________

1. The study investigated the effectiveness of music therapy for teaching social skills to students with autism and developmental disabilities. How important are the results of this study to the education of your child and children with similar impairments?

2. Please describe any improvements in social skills you observed in your child as a result of participating in this study.

3. Please comment on aspects of the study that you liked best.

4. Please comment on aspects of the study that you liked the least.


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APPENDIX C

MUSIC THERAPY SESSION SAMPLE

Population: Autism  Age: 5-7  Format: 20 minute group session

I. Opening
   a. Hello, How Ya Feelin’
      i. One at a time, each student asks one other student “How Are You Feelin’ Today?” through the lyrics of this song.

II. Movement
   a. You Gotta Sing When Your Spirit Says Sing
      i. Each student is given a turn to suggest a movement for the entire group to do as they sing this song.
   b. Friends Tap Gently/ Tap Your Neighbor’s Hand
      i. These two songs allow students an opportunity for safe physical contact by tapping their neighbor’s hand, elbow, shoulder, etc. Lyrics emphasize not hitting.

III. Guided Instrumental Activities
   a. Noodle (Twinkle, Twinkle Little Star)
      i. Students sing the word “noodle” to the tune of Twinkle Twinkle while passing around an instrument. Whoever has the instrument at the end of the musical phrase when the group says “Stop!” is out and becomes a “judge” of the game.
      ii. When a student becomes a judge, they get the privilege of determining whether other students are playing fairly, and they can call for a repeat round if they believe someone was cheating.
      iii. The last student left with the instrument becomes the leader for the next group activity.

IV. Singing
a. Loud and Quiet Journey
   i. Students choose a song to sing.
   ii. One student is chosen to be the sign holder and s/he holds signs that say “loud” and “quiet.”
   iii. Sign holder holds up the “quiet” sign and all students sing song quietly as we line up and walk out the door.
   iv. After students go through the door and are outside, the sign holder switches to the “loud” sign and students begin to sing loudly.
   v. Repeat process for going back inside.

b. “Can I Play with You Today?”
   i. As student sing this song with lyrics explaining how to ask someone to play, they practice asking someone if they can play with them at their center.

V. Closing

a. “It’s Your Solo”
   i. All students clap hands to the beat as one student at a time is called to take a dancing or rhythmic solo.

b. Present Super Music Student Award
   i. This is an award for good behavior that is given at the end of each session. It is a 2 x 2” cardboard square with stickers on it, saying “Super Music Student!” When students receive it, they are allowed to put it on their desk by their name for the rest of the day.
APPENDIX D

PROCEDURAL FIDELITY CHECKLIST
### Procedural Fidelity Checklist

<table>
<thead>
<tr>
<th>Session #</th>
<th>Procedure</th>
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<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>Follow session structure:</td>
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<tr>
<td></td>
<td>I. Opening</td>
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<tr>
<td></td>
<td>II. Movement</td>
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<td></td>
<td>III. Guided Instrumental Activities</td>
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<td></td>
<td>IV. Singing</td>
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<td>V. Closing</td>
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<tr>
<td>__ __ __ __ __</td>
<td>Provide schedule of activities</td>
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<tr>
<td>__ __ __ __ __</td>
<td>Provide opportunity for singing Hello</td>
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<td>Provide 1 opportunity for solo verbal or singing contributions per student (e.g., name favorite color, name instrument you are playing)</td>
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<tr>
<td>__ __ __ __ __</td>
<td>Provide 2 opportunities for “safe” physical contact (e.g., holding hands, passing instruments)</td>
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<td>__ __ __ __ __</td>
<td>Provide 1 opportunity for pairing with a partner</td>
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<td>Provide at least 1 activity for practicing asking questions</td>
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<td>__ __ __ __ __</td>
<td>Include 1 social story set to music per session</td>
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<td>Provide opportunity for singing Goodbye and/or a song reviewing what we learned</td>
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<td>__ __ __ __ __</td>
<td>Provide at least 1 activity for practicing not screaming</td>
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<tr>
<td>__ __ __ __ __</td>
<td>Provide at least 1 activity for practicing not hitting</td>
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<tr>
<td>__ __ __ __ __</td>
<td>Provide frequent positive reinforcement for desired behaviors (i.e., verbal praise, stickers, marshmallows, high fives, access to music)</td>
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<tr>
<td>__ __ __ __ __</td>
<td>Use a warning followed by time out consistently for negative behaviors</td>
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REFERENCES


VITA

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Catherine L. de Mers

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UNLV Graduate and Professional Student Association Scholarship, 2006

Thesis Title: Effects of Music Therapy on Prosocial Behavior of Students with Autism and Developmental Disabilities

Thesis Examination Committee:
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Committee Member, Dr. Kyle Higgins, Professor, Ph. D.
Committee Member, Dr. Renee Van Norman, Assistant Professor, Ph. D.
Graduate Faculty Representative, Dr. CarolAnne Kardash, Professor, Ph. D.